
Table Mountain Research

Outputs

- Comparison of measured automotive antenna patterns with computer simulations.
- Development of “ITS Interference Test Bed,” used to generate and analyze complex signals.
- Development of a 3-axis antenna to study the total incident field and polarization of a signal.
- Radar testing for the ITU-R.
- Cooperative research and development agreements with several private companies for work at the Table Mountain Field Site.

The Table Mountain Field Site and Radio Quiet Zone (see p. 67) supports fundamental research into the nature, interaction, and evaluation of telecommunication devices, systems, and services. To achieve this goal, the Table Mountain Research project actively solicits research proposals from both inside the Institute as well as from external agencies. This research serves to expand the knowledge base available to the Institute, helps identify emerging technologies, and provides for the development of new

measurement methods needed to study the characteristics of new devices and systems based on this technology. The results of the Table Mountain work are disseminated to the public via reports, technical papers, journal articles, conference papers, web documents, and computer programs. Highlights of the technical program are presented below.

Comparison of Measured Automotive Antenna Patterns with Computer Simulations

An antenna on a vehicle in a roadway environment does not behave as if it were in free space or over a perfectly conducting ground plane. The gain of the antenna is a function of the antenna geometry, materials used, antenna height above ground, ground conductivity, ground dielectric constant, frequency, elevation angle, and azimuth angle. The performance of an antenna near or on the surface of the earth is also very dependent on the interaction with the lossy earth and the automotive vehicle. Since antennas are commonly mounted on automobiles, an understanding of their performance in this environment is important for police, public safety, military, and commercial applications. This study was undertaken to provide a comparison between real-world measurements of antennas mounted on vehicles and computer simulations of these antennas.



Figure 1. Automotive antenna pattern study at the Table Mountain field site (photograph by J.D. Ewan).

For this study, antenna patterns and gains were measured at the Table Mountain Turntable Antenna Range at multiple frequencies from 41 to 918 MHz. Azimuth antenna patterns at several low elevation angles were measured using the azimuthal rotation of the turntable at multiple receiver antenna heights using a receiver antenna on a tower at a distance from the turntable. Simulation of these measurement scenarios will be completed in FY 2005 and the results will be compared.